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The collection is particularly rich in western and southern plants, and would make a very valuable addition to an eastern herbarium which lacks those plants. It is now offered for sale by Mrs. Parry, and copies of the list will be sent, (when issued), on application to Mrs. E. R. Parry, Davenport, Iowa.

Nyssa Sinensis is a new species of Tupelo described by Prof. D. Oliver in Hooker's Icones Plantarum, Plate·1964. The genus was formerly supposed to be confined to eastern North America, but has been found in the Himalayas, and this last species was collected by Dr. A. Henry in China. It is a small tree, about 20 feet high with ovate lanceolate, acuminate leaves, and pedicelled ovaries.

A Monument to Linnæus. The Chicago Herald of May 22d, contains an account and representation of the monument to Linnæus, presented to the City of Chicago by the Swedish Linnæan Monument Association. The figure of the great botanist is of bronze, upon a granite pedestal and when completed will have four allegorical figures at the base, representing four of the sciences in which he was distinguished.

Hepaticæ Americanæ, L. M. Underwood and O. F. Cook. We have recently received numbers 80-100, including recent collections in Florida by Prof. Underwood, in Mexico by Pringle, Macoun's British Columbia, Leiberg's Idaho, and New England specimens from A. W. Evans in the following genera: *Anthoceros*, *Asterella*, *Chiloseyphus*, *Frullania*, *Jubula*, *Jungermania*, *Lejeunia*, *Lepidozia*, *Lophocolea*, *Marsupella*, *Nardia*, *Plagiochila*, *Porella*, and *Radula*. E. G. B.

Potamogeton Javanicus, *Hassk. and its Synonymy.* Dr. Hans Schinz (Bull. Soc. Bot. Suisse i., 52-61). Dr. Schinz shows that the plant hitherto known as *P. tenuicaulis*, F. Von Müller, and *P. pavifolia*, Buch., and sometimes erroneously regarded as synonymous with our North American *P. hybridus*, Mx., from North Australia, Formosa, Japan and Korea, should bear the older name *P. Javanicus*, Hassk. T. M.

Reviews of Foreign Literature.

Contribution a l'Histoire Naturelle de la Truffe. A. Chatin. (Bull. Soc. Bot., France, xxxviii. 54-64).

Four species of Truffles are described; *Tuber nucinatum*, *T. heimalbum*, *T. brumale*, and *T. montanum.* They are associated all through France with *Tuber melanosporum* or *T. cibarium*, the "Truffe du Périgord" of the markets, and are often confounded with it, and, when possible, sold as such. In Algeria, Tunis and Morocco, a species of Truffle is known as *Terfâs*, and is the Mizy, or Mison, that in the days of Pliny the Romans obtained from Carthage and Lybia. It is the *Tuber niveum* of Desfontaines, the *Chœromyces*, and later, the *Terfezia Leonis* of of Tulasne Three species of African and Arabian *Terfâs* are described as *Terfezia Leonis*, Tulasne, *T. Boudieri* and *T. Boudieri*, var. *Arabica*, and a fourth is given a new generic as well as specific name, *Tirmannia Africana.* They are gathered in great quantities, and for many months are one of the most important of the caravan supplies. A. M. V.

Ueber Schutzmittel des Laubes gegen Transpiration, besonderes in der Flora Javas. A. F. W. Schimper: (Sitzungsberichte der Berl. Akadem. der Wissenschaften, 1890, S. 1045.)

Protective characters against a too rapid transpiration have, up to the present time, except in one or two cases caused by climatic changes, been recognized as found only in plants inhabiting deserts or extremely dry localities. (Xerophytes).

The observations communicated in the present paper (later to be enlarged and illustrated) have led to the remarkable conclusion that dryness of habitat is by no means the only influencing factor which may be active in causing the development of protective characters against transpiration.

Such characters are found quite universal in sea-shore (Halophytes) and alpine plants, and in temperate zones in all woody evergreens.

The sea-shore and alpine plants the author has recently throughly studied in Java, with the results communicated in the following paper.

I.—Sea-shore plants: (Strandpflanzen, Halophytes).

It is already well known that concentrated solutions of common salt exercise a retarding influence on transpiration, and that these regarding influences, beginning with 0.5, increase as the concentration increases.

Pfeffer* explaines this by saying that a concentrated salt solution has the same effect on the plant as a relatively dry soil would have, i.e. makes it very difficult for the plant to procure its necessary water. Experiments conducted by the author show that a concentrated solution of sodium chloride almost wholly destroys the assimilation of starch or glucose, so that neither are formed to any extent in the plant.

Germinating seedlings of corn were cultivated in a normal culture solution, both with and without a 0.5 (Proc.) solution of common salt. The first remained for three months, during the time of the experiment, without change and perfectly healthy ; the second in a similar solution but without salt, in the same time grew to very large dimensions. The plants cultivated with the salt solution contained neither starch nor glucose, while the other set of plants had their tissues filled with both. Plants cultivated in solutions with less salt give similar results, but less pronounced. Like results were obtained with a series of different plants, and the author deduces the following conclusion with respect to all halophytes, which invariably possess some kind of protective characters, just as desert plants do, to ensure them against a too rapid transpiration, and for the following reasons:

1. On account of the very greatly increased difficulty for such plants to obtain their water supply, while growing in salt water or a soil saturated by the same.
2. Because concentrated salt solutions in the plant cells wholly check the assimilative activity.
3. Because still more concentrated solutions cause the death of the plant.

In Java the sea-shore plants, or strand plants, may be readily divided into four groups :

1. The Mangrove-formation, covering the area of flood tide.
2. The Nipa-formation, distinguished through the presence of immense numbers of *Nipa fruticosa*, a small stemless palm which replaces the Mangrove in places where the water is less salt.
3. The Katappa-formation, growing just outside the reach of the

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*Pfeffer, Pflanzenphysiologie I. S. 151.

flood tide on the strand, characterized by the growth of *Terminalia Katappa, Casuarina equisetiformis, Cycas circinalis, Pandanus.*

4. The Pescapræ-formation, named after *Ipomœa pescapræ*, which closes down on the strand vegetation from behind, together with occasional trees and shrubs, creeping vines and low plants of various kinds from different families of Gramineæ, Leguminosæ and Convolvulaceæ, growing in the sand, characterizing this zone.

Notwithstanding the fact that all these plants, except those in the Pascapræ formation, take their root in a constantly wet substratum, yet they are emphatically xerophyllous in their character. This peculiarity finds expression in the thick, fleshy leaves, in the reduction of the transpiring surface, in the hairy covering, and in the vertical position of many leaves.

The anatomical structure shows it still plainer in the thick walls, strongly cuticularized outer cell coverings, deeply sunken stomata and fully developed water system.

In Buitenzorg, where plants from the strand had been cultivated back in common soil, away from the direct influences of the sea, these modified characters have been largely lost. The leaves from *Soneratia acida*, a mangrove, are no longer insolatral, but bifacial, much thinner than in the mangrove. The stomata are no longer sunken, the epidermis has thiner walls and the cuticula is also thinner.

II.—The Alpine Flora of Java.

Java is noted for its volcanoes, often united into small mountain chains. On some of these volcanoes the ground has been well cultivated to a height of from four to five thousand feet. Higher up are large tracts of forest. Still higher we come to the lower line of the foggy region, where rain falls daily. In this moist region we have every where a reduction in the stem and root growth of trees and plants in general, and a great increase in the leaf-surface. The trees are slim and loosely branched. Epiphytes abound on all the branches. Passing through the foggy region, which does not extend to the top of the mountain, one loses the hygrophyllous character of the vegetation, and comes at once into an outspoken xerophyllous zone. Here the characters, as expressed in the foggy region, are reversed. The trees become low and massive, the formation of wood is greatly emphasized, the leaves are thicker and much lessened in numbers, the root system is diminished and the branches become knotty and irregular, as is often seen in the Alps. Different kinds of Rhododendrons and Agapetes, which lower down grew only on trees, as epiphytes, change their habit and are found growing on the ground in great numbers. Mosses and Lichens are covering the scraggy trees. As one goes still higher the trees lessen into low matted bushes, which cover the highest points of the mountain peaks. This last formation on the summit, which may be compared with the alpine savannas, and is about 8,000 feet high, differs much more from the lower zones of vegetation on the same mountain, than these alpine savannas do from the lower wooded regions of the Alps, although on the highest points of the mountains of Java snow is unknown and the temperature is for the whole year favorable to plant developemnt.

The peculiarity of the alpine flora is not due to the low temperature to which it is exposed, but to protective characters, developed in order to shield it against a too rapid transpiration. The habit of species from widely separated families is here the same.

The xerophyllous character of the alpine flora of Java finds its expression not alone in physiological characteristics, or in the presence of Australian forms (*Leucopogon*, *Coprosoma*,) or in the lack of Phanerogams and other common characters, but in the most striking microscopic changes in the anatomy of the parts, all looking toward the conservation of moisture.

Plants with such characters generally lose them when cultivated for a time lower down in the valleys.

The peculiarities of our alpine flora, such as the gnarly growths, thickening of leaves, tomentose coverings, &c., have up to the present time been considered as adaptations to the low winter temperature, and the pressure of the snow. These characters are found, however, on the mountains of Java, in a nearly constant summer temperature. I do not hesitate to say that these conditions, both in the Alps and in Java are referable to one and the same cause, i.e.: the greater transpiration caused by less dense atmosphere and increased insolation, these conditions rendering it more difficult for the plant to provide itself with the necessary amount of water under such increased conditions of transpiration.

III.—Interchange of habitat between the Halophytes, Epiphytes and Alpine growths.

The resemblances existing between some of the strand plants and those of the alpine regions has already claimed some attention.

In Java this analogy may be easily observed. Between some of the strand trees and those of the high elevations there is great resemblance in the stunted and distorted appearance of each. *Dodonœa viscosa,* a common strand plant, appears suddenly at an elevation of 6,000 feet.

On some of the volcanoes within the region of fogs are found fumaroles. Around these the vegetation is entirely changed, becoming strongly xerophyllous. The Epiphytes, generally on trees in this belt, in the vicinity of the fumaroles, descend to the ground. Alpine plants are common here which usually occur at an elevation of 8,000 ft.

IV.—The Evergreen Woody Plants in Temperate Zones.

Many trees in the tropics drop their leaves at the beginning of the dry season. The leaf-fall in autumn in temperate zones the author also looks upon as protective in its character. Such trees could not make good the water lost on warm days in winter while the roots were frozen.

The fall of leaves both in warm and in tropical climates seems to depend more upon the dry period of such climates than on the change of temperature. Thus on such trees as *Pyrus communis, Pyrus Malus, Liriodendron Tulipifera,* and many others which drop their leaves normaly in the autumn the following observations were made. In the garden at Tjibodas, Java, where the climate changes but little in moisture or temperature throughout the entire year, the author observed on Dec. 13th, 1889, branches on any of these trees representing any or all seasons of the year, a definite time for leaf-fall having been entirely lost.

All our Evergreen trees are provided with some means of protection. This is especially true of the Pine family, the leaves of which are well provided with thick cuticula and sunken stomata.

All these modifications are looked upon as protective by the author, against a too rapid transpiration, and not against cold.

W. P. WILSON.